

## PATENT APPLICATION

This application is submitted in the name of the following inventors:

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## TITLE OF THE INVENTION

Best Price Search Engine Including Smart Coupons

## BACKGROUND OF THE INVENTION

1. *Field of the Invention*

The invention relates to a "best price" search engine, that allows for use of "smart coupons," such as might be used in e-commerce.

## 2. *Related Art*

Commerce conducted using computer networks can involve e-commerce, such as using web sites for promotion of goods, databases for maintaining goods and their prices, and communication between buyer and seller to conduct a sale. In e-commerce, it is often advantageous, to the potential buyer at least, to find the best price available for the same goods, where those goods can be compared between distinct sellers. For example, books are often identified using a known code, such as for example an ISBN number, that both identifies the selected book as a unique item for sale, and matches that unique item between distinct sellers. This has the effect that it is possible to compare prices for selected individual books and present information to a user regarding those prices, with the effect that the user can select their choice of where to purchase those selected books. Sellers of books are often referred to herein as "bookstores," even when there is no physical location that might be regarded as the "store."

A first problem with known systems for price searching is that there are often multiple aspects to the nature of the goods to be purchased, including for example delivery time and quality (such as for example "new" or "used" condition). This can be applicable even when the goods are uniquely identifiable, such as with books, because although the title and edition might be identical, the quality (new or used, and if used, with what degree of wear and tear) and delivery time (which might depend strongly on a selected method for shipping) might be substantially different, and thus might present

1 substantially different perceived utility to the potential buyer. Moreover, distinct sellers  
2 might present information regarding price and other factors different formats, with the  
3 effect that such searches involve either intelligent interpretation of the information, or  
4 alternatively, relatively difficult computation in parsing the web site presentation for  
5 desired information. There are a relatively large number of possible sellers (over 500  
6 known to be reachable online in the United States alone), and many of them are rela-  
7 tively unknown to the casual potential buyer, with the effect that such searches cannot  
8 easily be conducted "by hand."

9  
10 A second problem with known systems is that there are sometimes dis-  
11 counts, promotions, and other price reductions available to the user, with which the  
12 user is not necessarily familiar with, and which would affect the final price. For a first  
13 example, a designated bookstore might be advertising a sale on selected books, or for  
14 orders exceeding a selected amount. This information, in the price database for that  
15 bookstore, might not be associated with any identification for the selected book. For a  
16 second example, a designated bookstore might be advertising free shipping for a se-  
17 lected time, or for orders exceeding a selected amount. Similarly, this information, in  
18 the price database for that bookstore, might not be associated with any identification for  
19 the selected book. Also similarly to pricing information, distinct sellers might present  
20 information regarding coupons or discounts in different formats or at different locations  
21 within their web sites (or this information might be available using other channels en-  
22 tirely, such as for example other web sites, email advertising, or print advertising), with

1 the effect that such searches involve either intelligent interpretation of the information,  
2 or alternatively, relatively difficult computation in parsing the web site presentation for  
3 desired information. There are typically a relatively large number of possible coupons  
4 or discounts, of which many of them require at least some review of the product and  
5 computation of the effective price reduction, with the effect that such searches also can-  
6 not easily be conducted "by hand."

7  
8 Accordingly, a simple search for lowest stated price might not deliver suf-  
9 ficient information regarding how the product can be purchased at least effective price.

10  
11 A third problem with known systems for price searching, and for search-  
12 ing in general, is the trade-off between the amount of time allowed for response from a  
13 website with a possible search "hit," and the amount of time allowed to respond to the  
14 potential buyer with search results. For example, if a selected bookstore has a web  
15 server that is slow to respond, or even unavailable, that bookstore might end up ex-  
16 cluded from the search results if a relatively low threshold for response time is used.  
17 This problem is exacerbated if the book being searched for is relatively popular, even  
18 temporarily, such as for example at the time of release for the book, or such as for ex-  
19 ample at the beginning of a school term for class textbooks and workbooks. As noted  
20 above, there are a relatively large number of possible sellers, and many of them are  
21 relatively unknown to the casual potential buyer, with the effect that setting parameters

1 for response time for such searches cannot easily be tailored to each specific potential  
2 buyer.

3  
4 Accordingly, it would be advantageous to provide an improved technique  
5 less subject to problems with known systems.

## 6 7 SUMMARY OF THE INVENTION

8  
9 The invention provides a method and system capable of finding a best  
10 price available for a selected product, where the best price is computed including all  
11 relevant factors available to the search engine, including for example coupons (or other  
12 discounts), currency exchange rates, quality (as determined in response to preferences  
13 selected by the potential buyer), quantity desired, and shipping costs (similarly, as de-  
14 termined in response to preferences selected by the potential buyer).

15  
16 In one embodiment, the system searches separately for the product by  
17 price, and concurrently, searches for any available coupons or other discounts available  
18 for that product from the seller. When obtaining price information from the potential  
19 seller, the system also queries that seller for all relevant information relating to purchase  
20 decisions, such as for example condition or quality, shipping options, and applicable  
21 sales taxes. The system might also obtain relevant information from third-party  
22 sources, such as for example today's currency exchange rates for the currency in which

1 the price is denominated. When obtaining coupon or discount information from the  
2 potential seller, the system also queries that seller for all relevant information relating to  
3 applicability of that coupon or discount, such as for example, applicability to specific  
4 classes of books, a minimum order amount that must be exceeded, applicability to a  
5 specific type of shipping, time start and end for the coupon or discount, and whether  
6 the coupon or discount is computed as a fixed amount of price reduction or as a per-  
7 centage price reduction. The system matches price information with coupon informa-  
8 tion for each selected book (or other product) requested by the potential buyer, and in  
9 response thereto, computes an effective price that the potential buyer would have to  
10 pay after all relevant factors are taken into account.

11  
12 For one example, not intended to be limiting in any way, a book available  
13 at a first bookstore for \$50, but with 10% off orders exceeding \$25 and with free ship-  
14 ping within a selected range of locations (for which the potential buyer qualifies),  
15 would have an effective price to the potential buyer of \$45, while the same book avail-  
16 able at a second bookstore for \$40, but with a \$5 shipping charge and a 5% in-state sales  
17 tax (which would be applied to the potential buyer), would have an effective price to  
18 the potential buyer of \$47; that is, the lowest available price would not be the same as  
19 the lowest effective price.

20  
21 The system aggregates the information it obtains regarding those sellers  
22 offering the product, and presents to a potential buyer that aggregated information,

sorted (in one embodiment) by least effective cost, that is, when computation of the effective cost is taken into account, including information about aspects of that cost such as stated price, applicable coupons, shipping charges, and currency exchange rates. This has the effect that the potential buyer is able to select a seller of choice, either in response to least effective cost, or in response to other factors known to the user, such as for example reputation of the seller or shipping response time. In one embodiment, the user might filter or sort the results to restrict them to selected requirements, such as for example a designated quality of the product or a designated shipping response time.

In one embodiment, the system includes a web crawler capable of searching for available coupons and other promotional information, either automatically or in response to a search directed by an operator. The system maintains information regarding those available coupons and other promotional information in a database, including information sufficient for matching those available coupons and other promotional information with individual products possibly later selected by the user for possible purchase. For example, some coupons might be time limited (with a designated start time or end time), or might apply to specific products or categories of products, or might apply only when a designated volume of products is purchased. In one embodiment, this information might be augmented by additional information entered by operators, such as for example, coupons or discounts known to be available from review of print media, handbills or flyers, or announcements received in the mail.

1           The system maintains separate information for each product, uniquely  
2 identified by a system generated code, similar to an ISBN number for books, another  
3 unique ID for CDs (compact disks), or another unique ID for a different type of product.  
4 For each such product, the system maintains information in a database entry for that  
5 product, regarding all relevant information regarding price, including the stated price,  
6 the denominated currency, the condition of the product (for example, new or used, and  
7 if used, with what degree of wear and tear), the shipping options and other delivery  
8 time information available for the product (for example, how quickly the bookstore can  
9 locate the product and begin shipping, and how quickly the shipper can deliver the  
10 product to the potential buyer at their designated location), and the like. The system  
11 also maintains separate information for each discount, each also uniquely identified by  
12 a code, typically assigned by the system in response to a source of information for that  
13 specific discount.

14  
15           This has the effect that the system can match, in a cross-matching table,  
16 each possible product against each possible discount, along with all information rele-  
17 vant to purchase of that product. One such effect is that the system can determine  
18 which discounts are available at which sellers, which discounts apply to which prod-  
19 ucts, and what conditions are involved before the potential buyer can invoke the dis-  
20 count. In one embodiment, different versions of a product, different shipping options,  
21 and the like, are each maintained in the system databases as separately identifiable  
22 products, with the effect that if a coupon applies to only some versions of the product or



1 only some shipping options (for example, the coupon might offer free 3-day shipping,  
2 but no discount on 1-day shipping), that information can be used when matching possi-  
3 ble discounts with possible products. Similarly, a first discount might apply to a spe-  
4 cific book available at any seller (for example, because the publisher of the book offers  
5 the discount), while a second discount might apply to any book available at a specific  
6 seller (for example, because the specific seller offers the discount). In one embodiment,  
7 the cross-matching table includes matching this information, with the effect that the  
8 potential buyer is presented only with discounts that might actually apply to the se-  
9 lected products.

10  
11 In one embodiment, the system includes a high-speed web crawler, capa-  
12 ble of minimizing the amount of time involved in search while concurrently obtaining a  
13 best-quality search within those constraints. The high-speed web crawler includes  
14 techniques including at least the following:

- 15  
16 • dead link detection --- When searchable sellers are determined to have links that  
17 are dead or very slow, the high-speed web crawler maintains identifiers for those  
18 searchable sellers on a "do not crawl" list. A default TTL (time to live) value for  
19 prices for a selected searchable seller is preferably about 30 minutes, with the ef-  
20 fect that for that time, the high-speed web crawler will not attempt to search that  
21 seller at all. After the TTL has expired, another attempt is made to see if the link  
22 to the searchable seller is available within a reasonable time.

- 1  
2 • pre-fetching pricing data --- Some searchable sellers allow information to be ob-  
3 tained in advance of an actual search. For one example, not intended to be lim-  
4 iting in any way, some searchable sellers are willing to provide daily (or more  
5 frequent) pricing updates for a substantial portion of their searchable database.  
6 These the high-speed web crawler checks these pre-fetched pricing data before  
7 attempting to contact the searchable seller for an actual search, with the effect  
8 that it may not be necessary to search that seller at all.  
9
- 10 • pre-opened connections --- The high-speed web crawler maintains a number of  
11 open connections, such as for example open TCP/IP sockets and persistent  
12 HTTP connections, to searchable sellers. In one embodiment, the high-speed  
13 web crawler includes a cluster of several (in one embodiment, more than 10) de-  
14 vices, with the effect that the high-speed web crawler is capable of conducting  
15 searches of multiple sellers in parallel. In one embodiment, the high-speed web  
16 crawler conducts multiple HTTP requests concurrently or in parallel, with the ef-  
17 fect of substantially reducing aggregate search response time. In one embodi-  
18 ment, pre-opened connections include at least: (a) pre-fetched DNS information,  
19 (b) pre-opened TCP/IP sockets, and (c) pre-opened TCP/IP connections.  
20
- 21 • pre-searched products --- The high-speed web crawler maintains a selection of  
22 “popular” products, that is, products for which the most searches have been re-

1 requested by buyers in a recent time duration (such as for example, the most recent  
2 day). At times when there is little other activity, such as for example at night or  
3 at other times of low traffic, the high-speed web crawler pre-searches prices and  
4 discounts for those products and maintains search results in a relatively local  
5 database for substantially immediate response. In one embodiment, the most  
6 popular 10,000 books are pre-searched overnight, with the effect that prices and  
7 discounts are available for those most popular 10,000 books each morning with-  
8 out further search.

- 9
- 10 • adaptive TTL for selected sellers --- The high-speed web crawler maintains a se-  
11 lected TTL value for pricing and discount information for each searchable seller  
12 independently, with the effect that searchable sellers who update their prices  
13 more frequently are searched more frequently, and with the effect that searchable  
14 sellers who update their prices less frequently are searched less frequently. The  
15 inventors have found that TTL values for pricing are a useful proxy for alacrity  
16 of response from the seller. The high-speed web crawler maintains non-expired  
17 pricing and discount information in a relatively local database for substantially  
18 immediate response, with the effect that non-expired pricing and discount in-  
19 formation need not be further searched at all.
- 20

21 After reading this application, those skilled in the art would recognize that  
22 the invention includes an enabling technology by which substantial advance is made in

the art of intelligent searching. For example, the invention might be used to provide one or more of, or some combination or extension or mixture of, any of the following:

- Searching for not necessarily identical products or services, where the features of each product or service might be comparable, and where it is possible to determine the effective price for a product or service having a minimal set of features desired by the potential buyer. For example, not intended to be limiting in any way, cellular phones might be identifiable by their features, and a first model cellular phone having features A, B, and C, and an effective cost of \$50, would be preferable to a second model cellular phone having features A, B, C, and D, and an effective cost of \$75, where the potential buyer has indicated lack of interest in feature D. This would have the effect that purchasing the first model would be least effective cost for the purposes of that specific potential buyer.
- Searching for packages of multiple products or services, where the search is tailored to a combined effective price that is minimized for the entire package. For example, not intended to be limiting in any way, a set of books A, B, and C, might be available at a single location at a stated price of \$100 with a discount for purchases over \$80 of 10% and free shipping for more than 2 books, for an effective combined price of \$90, while the individual books might be available for less at other sellers, but with a combined price (for the minimum effective price of A individually, the minimum effective price of B individually, and the minimum

1 effective price of C individually) of \$80, but with no volume discount and total  
2 shipping charges of \$12, for an combined effective price of \$92. This would have  
3 the effect that purchasing all 3 books at one location is less expensive than pur-  
4 chasing them individually at their least cost apiece.

5  
6 Although described primarily with regard to books and CDs, a primarily  
7 with regard to price searching, the invention is not limited to those specific products,  
8 features, or those implementations described herein.

#### 9 10 BRIEF DESCRIPTION OF THE DRAWINGS

11  
12 Figure 1 shows a block diagram of a system including a best price search  
13 engine.

14  
15 Figure 2 shows a process flow diagram of a method including operation of  
16 a system including a best price search engine.

17  
18 Figure 3 shows a process flow diagram of a method including operation of  
19 a system including a high-speed web crawler associated with a best price search engine.  
20

## 1 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

2  
3 In the description herein, a preferred embodiment of the invention is de-  
4 scribed, including preferred process steps and data structures. Those skilled in the art  
5 would realize, after perusal of this application, that embodiments of the invention  
6 might be implemented using a variety of other techniques not specifically described,  
7 without undue experimentation or further invention, and that such other techniques  
8 would be within the scope and spirit of the invention.  
9

10 *Lexicography*

11  
12 The general meaning of each of these following terms is intended to be il-  
13 lustrative and in no way limiting.  
14

- 15 • The phrases "web site" and "web server" describe systems coupled to the World  
16 Wide Web (also referred to herein as the "web"), or a variant thereof, capable of  
17 being accessed by anyone with access to the web, or systems including computer  
18 programs that serve files or dynamic contents that form web pages to web users  
19 or computer programs that request them.  
20

- 1       • The phrases “stated price” and “best price” and “effective price” describe a price  
2       listed by the seller, a lowest price for the product, and a price representing a total  
3       cost to the buyer.  
4
- 5       • The term “database” describes any collection of data capable of, or organized for,  
6       electronic storage and retrieval on demand.  
7
- 8       • The phrases “same goods” and “unique item for sale” describe items that are  
9       substantially identical in nature to that being sought by a buyer, or describe a  
10      substantially specific or substantially uniquely identifiable item offered for sale.  
11
- 12      • The term “seller” describes any entity that has an item for sale.  
13
- 14      • The terms “bookstore” describes any entity, such as for example a firm or indi-  
15      vidual, storing or offering books (and possibly other items) for sale.  
16
- 17      • The phrase “present information” describes presenting data in a way to be  
18      meaningful to a buyer or seller in the context of a buying or selling decision.  
19
- 20      • The phrases “price searching” and “web crawler” describe any process of  
21      searching for information related to a price or cost of an item of interest, or any

1 process of searching web sites and related computer programs or databases for  
2 desired information.

- 3  
4 • The phrases “delivery time” and “shipping method” describe an amount of time  
5 (preferably measured as a number of days) involved in delivering a product  
6 from a seller (or a related fulfillment entity) to a buyer, and a mode or method by  
7 which delivery is performed.
- 8  
9 • The terms “condition” or “quality” (such as for example “new” or “used” condi-  
10 tion) describe a set of characteristics of the goods or products deemed relevant  
11 for searching, in response to an intent of the buyer or seller, or describe a set of  
12 system heuristics used in comparison or computation of a price for those goods  
13 or products.
- 14  
15 • The phrase “perceived utility” describes usefulness as presented to a user. It is  
16 responsive to a set of factors considered for making a purchase, some of which  
17 might be obvious and previously known to the buyer, and some of which might  
18 not be so obvious.
- 19  
20 • The phrase “different formats” describes different sets of methods including dif-  
21 ferent sets of attributes used to describe a product or its features.
- 22



- 1       • The phrases “intelligent interpretation of the information” and “computation in  
2       parsing the web site presentation” describe an effort or a set of techniques in-  
3       volved with identifying attributes of interest or relevance to identification of  
4       product and comparisons or computations of its price.  
5
- 6       • The phrase “by hand” describes use of human intelligence involved with sub-  
7       stantially manual operations.  
8
- 9       • The terms “coupons,” “discounts,” “promotions,” and the phrase “price reduc-  
10      tion” describe some of the factors involved with or affecting (such as for example  
11      reducing) a stated price of the product.  
12
- 13      • The term “search” generally describes a step of reading or attempting to read in-  
14      formation at an information source (such as for example, a seller’s web site or  
15      web page or database, whichever is accessible for searching).  
16
- 17      • The phrase “search result” generally describes a result of a search of one infor-  
18      mation source, or a set of searches of multiple information sources.  
19
- 20      • The phrase “search hit” generally describes a result of a search of one informa-  
21      tion source resulting in finding the information searched for, such as for example  
22      a specific object offered for sale.

- 1  
2     • The phrase "response time" generally describes a time elapsed from a time a  
3     buyer sends request for a price to a time when the buyer receives information re-  
4     garding that price. In one embodiment, "response time" is used to refer gener-  
5     ally to a result of a search of multiple information sources, and the aggregation of  
6     search results into an aggregate response.  
7
- 8     • The phrases "relevant factors" and "relevant information relating to purchase"  
9     and "relevant information relating to applicability of that coupon or discount"  
10    describe attributes or characteristics of information, specific information in-  
11    volved in making a purchase decision and the information involved in checking  
12    the validity of a coupon or discount such as price of a book, condition of a book  
13    or location of buyer, or other such information.  
14
- 15    • The phrase "third-party source" describes a party that might supply information  
16    needed to help a buyer make a purchase or compute an effective price. In one  
17    embodiment, this information might not be available on the seller's web site or  
18    readily available to the buyer, and involves having the system glean that infor-  
19    mation from a source other than the buyer or the seller.  
20
- 21    • The phrase "fixed amount of price reduction" generally describes a numeric  
22    value to be deducted from the price independent of the amount of stated price.

1 The phrase "as a percentage price reduction" a numeric value to be deducted  
2 from the price whose value is responsive to a total amount of the stated price,  
3 such as for example a fixed fraction (for example, 10%) of that total amount of the  
4 stated price.

- 5  
6 • The phrase "aggregated information" describes information related to purchase  
7 collected from more than one source of such information (such as for example, a  
8 buyer, a seller, any third parties), and aggregated for presentation to the buyer.

9  
10 The phrase "reputation of the seller" generally describes information relating to  
11 the quality or character of the seller, such as for example as determined by peo-  
12 ple who do business with the seller, or such as for example as determined by a  
13 third party (such as a professional rating service or other source).

14  
15 The term "operator" generally describes any entity or person who initiates or  
16 conducts a search and or purchase, including for example any persons who op-  
17 erate a device connected to the network or the web and capable of those func-  
18 tions.

- 19  
20 • The phrase "denominated currency" generally describes a currency named or  
21 designated as the currency in which the stated price is measured.

- 1       • The phrase “shipping options and other delivery time information (for example,  
2       how quickly the bookstore can locate the product and begin shipping, and how  
3       quickly the shipper can deliver the product to the potential buyer at their desig-  
4       nated location)” generally describes the methods of delivering the product from  
5       seller to the buyer and time required to execute that delivery.  
6
- 7       • The phrase “match, in a cross-matching table” generally describes a step of at-  
8       tempting to find values for factors (whether described, preferred, or required)  
9       named by a buyer, and match those values in a set of information (such as for ex-  
10      ample a set of computed or stored values). In one embodiment, the step of  
11      matching is performed with the effect of supporting a comparison of effective  
12      price or a purchase decision. Depending on context here, this phrase can also re-  
13      fer to a successful match, or to a result of such a match.  
14
- 15      • The phrase “not necessarily identical products or services, where the features of  
16      each product or service might be comparable” generally describes a set of prod-  
17      ucts or services that share common traits or features.  
18
- 19      • The phrase “minimal set of features” generally describes a smallest set of attrib-  
20      utes or characteristics (whether described, preferred, or required) named by a  
21      buyer for a specific good or service.  
22

- The phrase "system generated unique product ID" generally describes an identifying code capable of being generated by a system in response to a set of disparate information about a good or service, with the effect of being capable of uniquely identifying that good or service, such as when used in a price comparison step.

- The phrase "packages of multiple products or services, where the search is tailored to a effective combined price" generally describes a concept in which an effective price might be computed in response to a set of more than one good or service, whose collective purchase might be different from individual purchase. For one example, not intended to be limiting in any way, if a buyer were to attempt to purchase all known "Harry Potter" books, it might be possible to obtain a lower effective price (after computing shipping) for purchasing them as a group, rather than purchasing them from disparate sources.

The scope and spirit of the invention is not limited to any of these definitions, or to specific examples mentioned therein, but is intended to include the most general concepts embodied by these and other terms.

#### *System Elements*

1           Figure 1 shows a block diagram of a system including a best price search  
2 engine.

3  
4           A system 100 includes a communication link 110, a buyer subsystem 120, a  
5 set of seller subsystems 130, and a search subsystem 140.

6  
7           The communication link 110 includes any technique capable of delivering  
8 information from senders to receivers. In one embodiment, the communication link 110  
9 includes a computer network, such as for example the Internet, operating using known  
10 communication protocols, such as for example TCP/IP, HTTP, SSL over secure HTTP,  
11 and variants thereof. However, in alternative embodiments, the communication link  
12 110 might include other known techniques for communication, such as for example a  
13 computer BBS (Bulletin Board System) or the use of TELNET or FTP to couple the seller  
14 subsystems 130 to the search subsystem 140.

#### 15 16           *Buyer Subsystem*

17  
18           The buyer subsystem 120 is associated with one or more potential buyers  
19 121, and includes a buyer subsystem processor 122, program and data memory, a buyer  
20 input element 123, and a buyer output element 124.

1           Although the potential buyer 121 is described herein as an individual  
2 natural person, it is possible for the potential buyer 121 to include a business entity, an  
3 organization or other group of people. It is also possible for the potential buyer 121 to  
4 include a computer program operating under instructions to perform some or all of the  
5 functions attributed to an intelligent natural person, or an Artificial Intelligence pro-  
6 gram or other system with the capability of initiating requests and interpreting re-  
7 sponses thereto.

8  
9           The buyer input element 123 is capable of receiving commands, informa-  
10 tion, and instructions from the potential buyer 121. In one embodiment, the buyer in-  
11 put element 123 includes a keyboard and a pointing device, such as a mouse or touch  
12 pad, capable of providing key presses and mouse clicks or drags, interpretable by the  
13 buyer subsystem processor 122. However, in alternative embodiments, the buyer input  
14 element 123 may include alternative techniques for information input, including for ex-  
15 ample a telephone keypad; a voice recognition system, a handwriting or graffiti recog-  
16 nition system, or a combination or conjunction thereof. The buyer subsystem 120 in-  
17 cludes software instructions capable of being interpreted by the buyer subsystem proc-  
18 essor 122 to parse and respond to those commands, information, and instructions, and  
19 to deliver those commands, information, and instructions from the potential buyer 121  
20 using the buyer input element 123, to other elements of the system 100 using the com-  
21 munication link 110. In one embodiment, the buyer input element 123 is coupled to the  
22 search subsystem 140, using the communication link 110, and is capable of sending

1 those commands, information, and instructions to the search subsystem 140 for action  
2 thereon.

3  
4 The buyer output element 124 is capable of receiving responses and other  
5 information from the other elements of the system 100 using the communication link  
6 110, and presenting those responses and other information to the potential buyer 121.  
7 In one embodiment, the buyer output element 124 includes a monitor or flat screen dis-  
8 play, and a set of audio speakers. Similarly, the buyer subsystem 120 includes software  
9 instructions capable of being interpreted by the buyer subsystem processor 122 to parse  
10 and present those responses and other information. In one embodiment, the buyer sub-  
11 system 120 presents search results in a tabular form, or any other form convenient for  
12 the potential buyer 121 (such as for example, a sequence of XML capable of being inter-  
13 preted by a web browser for presentation, or by a database or Artificial Intelligence  
14 program for maintenance or interpretation of the data therein).

15  
16 *Seller Subsystem*

17  
18 The seller subsystem 130 is associated with one or more potential sellers  
19 131, and includes a seller subsystem processor 132, program and data memory, and a  
20 seller database 133.



1           Although the potential seller 131 is described herein as an individual  
2 bookstore, it is possible for the potential seller 131 to be a collection of such bookstores,  
3 a chain of bookstores, another business entity, an individual natural person or a group  
4 thereof (similar to the potential buyer 121). It is also possible for the potential buyer 121  
5 to include a computer program operating under instructions to perform some or all of  
6 the functions attributed to an intelligent natural person, or an Artificial Intelligence  
7 program or other system with the capability of initiating requests and interpreting re-  
8 sponses thereto.

9  
10           In one embodiment, the seller subsystem 130 includes a web server con-  
11 trolled by the subsystem processor 132, and coupled to the seller database 133. How-  
12 ever, in alternative embodiments, the seller subsystem 130 might include a BBS or an  
13 element responsive to a TELNET connection (or other variant protocol). The seller sub-  
14 system 130 includes software instructions capable of being interpreted by the seller sub-  
15 system processor 122 to parse and respond to commands, information, and instructions  
16 from the buyer subsystem 120 and from the search subsystem 140.

17  
18           The seller database 133 includes a set of web pages or other network ob-  
19 jects capable of being presented by the web server included in the seller subsystem 130,  
20 in response to commands, information, and instructions from the buyer subsystem 120  
21 or from the search subsystem 140. In one embodiment, the seller database 133 includes  
22 a set of entries including information regarding products available for sale by the po-

1   tential seller 131, such as for example a set of entries each describing a unique book, as  
2   indexed by the ISBN for that book, or a unique CD, as indexed by a unique ID for that  
3   CD.

4  
5         The seller database 133 also includes a set of information embedded in  
6   those web pages regarding purchases by potential buyers 121, including shipping op-  
7   tions, taxes, and possible discounts available to those potential buyers 121, for selected  
8   books, for selected categories of books (such as for example "best sellers"), or for book  
9   orders meeting selected criteria (such as for example 10% off if the book order exceeds  
10   \$100, or free 3-day shipping if the book order exceeds \$50).

#### 11 12         *Search Subsystem*

13  
14         The search subsystem 140 is associated with a search entity 141, and in-  
15   cludes a search subsystem processor 142, program and data memory, a product data-  
16   base 143, and a discount database 144.

17  
18         Although the search entity 141 is described herein as an individual busi-  
19   ness entity, it is possible for the search entity 141 to be a collective, other organization,  
20   or other group of people or entities.

1           The search subsystem 140 is capable of receiving commands, information,  
2 and instructions from the potential buyer 121, and of receiving responses thereto and  
3 other information from one or more seller subsystems 130. The search subsystem 140  
4 includes software instructions capable of being interpreted by the search subsystem  
5 processor 142 to parse and respond to those commands, information, and instructions  
6 from the potential buyer 121, and of being interpreted by the search subsystem proces-  
7 sor 142 to parse and forward responses thereto and other information from one or more  
8 seller subsystems 130.

9  
10           The search subsystem 140 includes a product database 143, in which the  
11 search subsystem 140 is capable of maintaining information about individual products  
12 (and variations thereof, such as those variations in response to condition or quality, or  
13 shipping options). Similarly, the search subsystem 140 includes a discount database  
14 144, in which the search subsystem 140 is capable of maintaining information about in-  
15 dividual discounts (and variations thereof, such as those variations in response to order  
16 size, or number of books ordered). The search subsystem 140 includes software in-  
17 structions capable of being interpreted by the search subsystem processor 142 to match  
18 individual products in the product database 143 against individual discounts in the dis-  
19 count database 144, with the effect of determining for which products those discounts  
20 apply. The search subsystem 140 includes software instructions capable of being inter-  
21 preted by the search subsystem processor 142 to compute an effective price for each

1 product requested by the potential buyer 121, after application of relevant information  
2 including discounts, shipping options and costs, and taxes.

3  
4 Although described as separate devices, in the context of the invention  
5 there is no particular requirement that the buyer subsystem 120 and the search subsys-  
6 tem 140 be separate devices, or even that they be isolated subsystems part of the same  
7 device. Rather, the buyer subsystem 120 and the search subsystem 140 are described  
8 herein as separate devices to illustrate the different functions each performs. In one  
9 embodiment, the buyer subsystem 120 and the search subsystem 140 might be collo-  
10 cated at a single hardware device, using software appropriate to the processes and data  
11 structures described herein.

12  
13 Similarly, although described as separate devices, in the context of the in-  
14 vention there is no particular requirement that the seller subsystems 130 and the search  
15 subsystem 140 be separate devices, or even that they be isolated subsystems part of the  
16 same device. Rather, the seller subsystems 130 and the search subsystem 140 are de-  
17 scribed herein as separate devices to illustrate the different functions each performs. In  
18 one embodiment, the seller subsystems 130 and the search subsystem 140 might be col-  
19 located at a single hardware device, using software appropriate to the processes and  
20 data structures described herein.

## *Method of Operation (Best Price Search)*

Figure 2 shows a process flow diagram of a method including operation of a system including a best price search engine.

Although described serially, the flow points and method steps of the method 200 can be performed by separate elements concurrently, in conjunction, or in parallel, whether asynchronously or synchronously, in a pipelined manner, or otherwise. In the context of the invention, there is no particular requirement that the method must be performed in the same order in which this description lists flow points or method steps, except where explicitly so stated.

### *Pre-Populating the Databases*

At a flow point 210A, the search subsystem 140 is ready to pre-populate its product database 143 and its discount database 144.

At a step 211, the search subsystem 140 sends requests to each seller subsystem 130, requesting pricing information for each product known to the search subsystem 140. As part of this step, if the search subsystem 140 is aware that only a subset of those products are available at a particular seller subsystem 130, the search subsystem

tem 140 only requests that particular seller subsystem 130 for pricing information for that subset of products.

In one embodiment, pricing information includes at least some of the following:

identifiers for the particular potential seller 131, the particular product (such as for example an ISBN for a book);

- information about that particular product, including a location at the particular seller subsystem 130 at which to find information about that particular product (such as for example a URL for the page relating to that book), a location at the particular seller subsystem 130 at which to find specific pricing information about that particular product (such as for example a URL for the price of that book);
- information about aspects of that product relating to pricing, including a currency for the prices described at that seller subsystem, and information regarding shipping and handling (such as for example a URL for the shipping options, costs and shipping time associated with that book, and a URL for any handling or packaging fee associated with that book); and

- information about how quickly the information about that particular product is likely to change, such as for example a TTL (time to live) value indicating how long that quoted price is still good.

In one embodiment, a set of identifiers for particular products are not necessarily ISBN values, but in addition or instead include a system generated unique product ID, independently generated by the search subsystem 140, in response to a set of information having multiple elements. The system generated unique product ID is responsive to a set of factors. For example, not intended to be limiting in any way, in the case of a CD or DVD, the system generated unique product ID might be responsive to (1) a title of the product, such as for example the CD or DVD "Cast Away," (2) an actor known to be featured in that CD, such as for example the actor Tom Hanks, (3) a director known to be associated with that CD or DVD, such as for example the director Robert Zemeckis, (4) a UPC code for that CD or DVD, such as for example the UPC code 024 543 017 905, (5) a studio known to be associated with that CD or DVD, such as for example the studio Sony, (6) a release date known to be associated with that CD or DVD, such as for example the date 06/12/2001, (7) a format known to be associated with that CD or DVD, such as for example a DVD format, (8) a rating known to be associated with that CD or DVD, such as for example the rating PG-13, (9) a region known to be associated with that CD or DVD, such as for example region code 1, US/Canada only, (10) a list price known to be associated with that CD or DVD, such as for example the list price \$24.98, (11) a product image known to be associated with that CD or DVD,

1 such as for example an image of cover art represented by a BMP file or a GIF file, and  
2 (12) possibly other information necessary or desirable to distinguish the product from  
3 others that might be similar. In this example, not intended to be limiting in any way,  
4 this particular CD or DVD would have a system generated unique product ID of 231  
5 235.

6  
7 In one embodiment, ISBN values are used to identify books.

8  
9 As part of this step, the requests to each seller subsystem 130 include in-  
10 formation sufficient for that seller subsystem 130 to search its own database of products  
11 for the unique product desired by the buyer.

12  
13 In one embodiment, when the search is for a book, the search subsystem  
14 140 provides the ISBN to the seller subsystem 130, with the effect that the seller subsys-  
15 tem 130 is capable of locating the unique book.

16  
17 When the search is for a CD or DVD, or other product, the search subsys-  
18 tem 140 uses its own system generated unique product ID to find information associ-  
19 ated with that product from its own database, and provides that information to the  
20 seller subsystem 130 in association with the search request. This has the effect that the  
21 seller subsystem 130 is capable of performing an independent search of its own data-  
22 base, and thus has the effect the seller subsystem 130 is capable of locating the unique



1 CD or DVD, or other product. For example, not intended to be limiting in any way, in  
2 the case of a CD or DVD, substantially all seller subsystems 130 provide for search in  
3 response to the 3-tuple of information {title, actor, director}. This has the effect that the  
4 search subsystem 140 is capable of providing that 3-tuple of information to the seller  
5 subsystem 130, and the seller subsystem 130 is capable of providing pricing information  
6 for a set of CDs or DVDs having those attributes.

7  
8 As part of this step, the search subsystem 140 performs the following sub-  
9 steps:

10  
11 At a sub-step 211(a), the results of search from each seller subsystem 130  
12 are matched by the search subsystem 140 against the information associated with that  
13 product from its own database.

14  
15 At a sub-step 211(b), the search subsystem 140 computes a degree-of-  
16 match value in response to the match attempt. In one embodiment, the degree-of-match  
17 value is responsive to each piece of information associated with that CD or DVD, with  
18 the effect that the search subsystem 140 is capable of computing a "fuzzy" value (such  
19 as for example known in the art of fuzzy logic) quantifying the degree-of-match be-  
20 tween the database entry from the seller subsystem 130 with the database entry from  
21 the search subsystem 140.

1           At a sub-step 211(c), the search subsystem 140 compares the degree-of-  
2 match value with a selected threshold value. For one example, not intended to be lim-  
3 iting in any way, in one embodiment the selected threshold value might be a 70% de-  
4 gree-of-match value or better. If the actual degree-of-match value is greater than the  
5 selected threshold (for example, 80%, which is  $> 70\%$ ), the search subsystem 140 consid-  
6 ers the result a search hit, with the effect that it obtains pricing information from the  
7 seller subsystem 130 and incorporates that pricing information into its aggregated  
8 search results. If the actual degree-of-match value is less than the selected threshold  
9 (for example, 60%, which is  $< 70\%$ ), the search subsystem 140 considers the result a  
10 search miss (that is, not a search hit), with the effect that it does not obtain pricing in-  
11 formation from that seller subsystem 130 and does not incorporate any pricing infor-  
12 mation from that seller subsystem 130 into its aggregated search results.

13  
14           At a step 212, the search subsystem 140 updates its product database 143  
15 with pricing information received from the seller subsystems 130. This step might be  
16 performed in parallel or concurrently with the previous step, as each seller subsystem  
17 130 might respond within a different response time.

18  
19           At a step 213, the search subsystem 140 sends requests to each seller sub-  
20 system 130, requesting discount information for each discount known to the search sub-  
21 system 140. As part of this step, if the search subsystem 140 is aware that only a subset  
22 of those discounts are available at a particular seller subsystem 130, the search subsys-

1   tem 140 only requests that particular seller subsystem 130 for discount information for  
2   that subset of discounts.

3  
4         In one embodiment, discount information includes at least some of the  
5   following:

- 6  
7         • identifiers for the particular potential seller 131, the particular discount (such as  
8         for example a primary key associated with the discount database 144), and an  
9         identifier for that discount at the seller subsystem 130 (such as for example a  
10        coupon code or a confirmation password for the discount);  
11
- 12        • information about that particular discount, including a minimum purchase order  
13        size, a fixed amount of price reduction (such as for example, "\$5 off"), a percent-  
14        age amount of price reduction (such as for example, "10% off");  
15
- 16        • information about restrictions on that discount (such as for example whether it is  
17        restricted to a particular product or class of products, or whether the discount  
18        relates to new or used books); and  
19
- 20        • information about how to use the discount at the seller subsystem 1300 (such as  
21        for example a URL for activation of the discount).
- 22

1           At a step 214, the search subsystem 140 updates its discount database 143  
2 with discount information received from the seller subsystems 130. This step might be  
3 performed in parallel or concurrently with the previous step, as each seller subsystem  
4 130 might respond within a different response time.

5  
6           At a step 215, the search subsystem 140 receives any additional discount  
7 information from an operator available at the search subsystem 140, such as for example  
8 an individual tasked with searching the Internet for discount information and entering  
9 that information into the search subsystem 140. As part of this step, the search subsys-  
10 tem 140 updates its discount database 143 with discount information received from the  
11 operator.

12  
13           At a flow point 210B, the search subsystem 140 has pre-populated its  
14 product database 143 and its discount database 144, and is ready to proceed with an-  
15 other action.

16  
17           *Matching Discounts to Products*

18  
19           At a flow point 220A, the search subsystem 140 is ready to match particu-  
20 lar discounts with particular products.

1           At a step 221, the search subsystem 140 loops over each potential seller  
2 131, determining which discounts in the discount database 144 are applicable to which  
3 products in the product database 143, and which discount in the discount database 144  
4 is the "best" discount for each product in the product database 143. In some cases, it  
5 might occur that there is more than one "best" discount for a particular product, be-  
6 cause the choice of "best" discount depends on some aspect of the potential buyer 121  
7 (such as for example where the potential buyer 121 resides) or some aspect of the order  
8 placed by the potential buyer 121 (such as for example an order size).

9  
10           At a step 222, the search subsystem 140 associates the (one or more) "best"  
11 discount(s) in the discount database 144 with each product in the product database 143.

12  
13           At a flow point 220B, the search subsystem 140 has matched particular  
14 discounts with particular products, and is ready to proceed with another action.

15  
16           *Searching on Behalf of the Buyer*

17  
18           At a flow point 230A, the buyer subsystem 120 is ready to process a re-  
19 quest to search for a best price for one or more selected products.

20  
21           At a step 231, the buyer subsystem 120 receives information from the po-  
22 tential buyer 121 regarding one or more selected products to search.

1  
2           At a step 232, the buyer subsystem 120 sends a request to the search sub-  
3 system 140 including relevant information obtained from the potential buyer 121.  
4

5           At a step 233, the search subsystem 140 matches the one or more selected  
6 products to search against its product database 143. To perform this step, the search  
7 subsystem 140 performs the following sub-steps:  
8

- 9       • At a sub-step 233(a), the search subsystem 140 retrieves information regarding  
10 potential sellers 131 for those one or more selected products. As part of this sub-  
11 step, the information regarding potential sellers 131 includes pricing information  
12 for those one or more selected products, as obtained from that seller subsystem  
13 130.  
14
- 15       • At a sub-step 233(b), the search subsystem 140 determines if the TTL for the  
16 pricing information indicates that the pricing information has expired or should  
17 be refreshed. If not, the method 200 proceeds with the next step. If so, the  
18 method 200 proceeds with the rest of the sub-steps for this step.  
19
- 20       • At a sub-step 233(c), the search subsystem 140 re-contacts the seller subsystem  
21 130 and obtains fresh pricing information. As part of this sub-step, the search  
22 subsystem 140 updates its product database 143.

- 1
- 2       • At a sub-step 233(d), the search subsystem 140 determines if the TTL for the dis-
- 3       count information indicates that the discount information has expired or should
- 4       be refreshed. If not, the method 200 proceeds with the sub-step 233(f). If so, the
- 5       method 200 proceeds with the next sub-step for this step.
- 6
- 7       • At a sub-step 233(e), the search subsystem 140 re-contacts the seller subsystem
- 8       130 and obtains fresh discount information. As part of this sub-step, the search
- 9       subsystem 140 updates its discount database 144.
- 10
- 11       • At a sub-step 233(f), the search subsystem 140 re-performs the steps between the
- 12       flow points 22oA and 22oB, with the effect that the fresh pricing information and
- 13       the fresh discount information are re-matched and the “best” discount is re-
- 14       associated with the product.
- 15

16               At a step 234, the search subsystem 140 responds to the buyer subsystem  
17 120 with a set of potential sellers 131, along with each one’s associated pricing informa-  
18 tion and “best” discount. As part of this step, the search subsystem 140 computes the  
19 effective price for each potential seller 131 (for each of the products).

20

21               At a step 235, the buyer subsystem 120 presents the information it re-  
22 ceived in the previous step to the potential buyer 121. In one embodiment, the buyer

1 subsystem 120 presents that information in tabular form, sorted by effective price, with  
2 the lowest effective price first.

3  
4 At a flow point 230B, the buyer subsystem 120 has processed a request to  
5 search for a best price for one or more selected products, and is ready to proceed with  
6 another action.

7  
8 *Method of Operation (High-Speed Search)*  
9

10 Figure 3 shows a process flow diagram of a method including operation of  
11 a system including a high-speed web crawler associated with a best price search engine.  
12

13 Although described serially, the flow points and method steps of the  
14 method 300 can be, and preferably are, performed by separate elements concurrently, in  
15 conjunction, or in parallel, whether asynchronously or synchronously, in a pipelined  
16 manner, or otherwise. In the context of the invention, there is no particular requirement  
17 that the method must be performed in the same order in which this description lists  
18 flow points or method steps, except where explicitly so stated.  
19

20 In one embodiment, the system includes a high-speed web crawler, capa-  
21 ble of minimizing the amount of time involved in search while concurrently obtaining a  
22 best-quality search within those constraints.



1  
2           *Dead Link Detection*

3  
4           At a flow point 310A, the search subsystem 140 is ready to produce a “do  
5 not crawl” list.

6  
7           At a step 311, the search subsystem 140 detects a link to a searchable seller  
8 subsystem 130 that is slower than a selected threshold duration. In one embodiment,  
9 this threshold duration might be set to a value such as for example about 10 minutes,  
10 with the effect that any seller subsystem 130 that takes longer than the threshold dura-  
11 tion would be considered by the search subsystem 140 to be a “dead link” (or a very  
12 slow link).

13  
14           At a step 312, the search subsystem 140 adds the seller subsystem 130 for  
15 which the search subsystem 140 considered to be a “dead link” (or a very slow link) to a  
16 “do not crawl” list. The search subsystem 140 sets a TTL (time to live) value for that  
17 particular seller subsystem 130, such as for example about 30 minutes.

18  
19           At a step 313, the search subsystem 140 receives a request from a buyer  
20 subsystem 120, requesting a search of pricing and discount information from seller sub-  
21 systems 130.

1           At a step 314, the search subsystem 140 matches the request from the pre-  
2 vious step against its "do not crawl" list. If the seller subsystem 130 for which the  
3 search subsystem 140 considered to be a "dead link" (or a very slow link) is on the "do  
4 not crawl" list, and the TTL for that particular seller subsystem 130 has not timed out,  
5 the search subsystem 140 skips that seller subsystem 130 for any search requests. If the  
6 TTL for that particular seller subsystem 130 has timed out, the search subsystem 140  
7 retries that seller subsystem 130 for any search requests, even if it is already on the "do  
8 not crawl" list.

9  
10           At a step 315, if the search subsystem 140 retried a particular seller sub-  
11 system 130 in the previous step, even if it is already on the "do not crawl" list, and that  
12 particular seller subsystem 130 responded within a reasonable time (such as for exam-  
13 ple 10 minutes), the search subsystem 140 takes that particular seller subsystem 130 off  
14 the "do not crawl" list.

15  
16           At a flow point 310B, the search subsystem 140 has produced (and is us-  
17 ing) a "do not crawl" list, and is ready to proceed with another action.

18  
19           *Pre-Fetching Pricing and Discount Data*

20  
21           At a flow point 320A, the search subsystem 140 is ready to pre-fetch pric-  
22 ing and discount data.

1  
2           At a step 321, the search subsystem 140 maintains a list of seller subsys-  
3       tems 130 willing to provide pricing or discount data in advance of an actual search,  
4       such as for example seller subsystems 130 that are willing to provide daily (or more fre-  
5       quent) pricing updates for a substantial portion of their searchable database.

6  
7           At a step 322, the search subsystem 140 receives pre-fetched pricing or  
8       discount data from those seller subsystems 130, in advance of an actual search.

9  
10          At a step 323, the search subsystem 140 pre-populates a pricing database  
11       and a discount database with that pre-fetched pricing or discount data.

12  
13          At a flow point 320B, the search subsystem 140 has pre-fetched (and is  
14       using) pricing and discount data, and is ready to proceed with another action.

15  
16           *Pre-Opened Connections*

17  
18          At a flow point 330A, the search subsystem 140 is ready to pre-open con-  
19       nections to searchable seller subsystems 130.

20  
21          At a step 331, the search subsystem 140 opens connections to searchable  
22       seller subsystems 130, in advance of receiving any search requests from a buyer sub-

1 system 120. In one embodiment, these pre-opened connections include open TCP/IP  
2 sockets and persistent HTTP connections. In one embodiment, pre-opened connections  
3 include at least: (a) pre-fetched DNS information, (b) pre-opened TCP/IP sockets, and  
4 (c) pre-opened TCP/IP connections. In one embodiment, the high-speed web crawler  
5 includes a cluster of several (in one embodiment, more than 10) devices, with the effect  
6 that the high-speed web crawler is capable of conducting searches of multiple sellers in  
7 parallel.

8  
9 At a step 332, similar to the step 313, the search subsystem 140 receives a  
10 request from a buyer subsystem 120, requesting a search of pricing and discount infor-  
11 mation from seller subsystems 130.

12  
13 At a step 333, the search subsystem 140 conducts multiple HTTP requests  
14 with searchable seller subsystems 130, concurrently or in parallel, with the effect of sub-  
15 stantially reducing aggregate search response time.

16  
17 At a flow point 330B, the search subsystem 140 has pre-opened (and is  
18 using) connections to searchable seller subsystems 130, and is ready to proceed with  
19 another action.

20  
21 *Pre-Searched Products*  
22

1           At a flow point 340A, the search subsystem 140 is ready to pre-search a  
2 selected set of products.

3  
4           At a step 341, the search subsystem 140 determines a selection of "popu-  
5 lar" products, that is, products for which the most searches have been requested by  
6 buyers in a recent time duration. In one embodiment, the number of such products is  
7 about 10,000, and the time duration is about 24 hours.

8  
9           At a step 342, the search subsystem 140 determines if there is little other  
10 activity, such as for example at night or at other times of low traffic. If not, after a se-  
11 lected time duration (such as for example 4 hours), the search subsystem 140 returns to  
12 the flow point 340A to try to pre-search products again. In one embodiment, the search  
13 subsystem 140 forces the determination that there is little other activity to a logical  
14 "yes" at a selected time at night, such as for example 3:00 a.m.

15  
16           At a step 343, the search subsystem 140 searches pricing information and  
17 discount information for those popular products, even though not triggered by any ex-  
18 plicit request from a buyer subsystem 120.

19  
20           At a step 344, the search subsystem 140 maintains results from the previ-  
21 ous step in a relatively local database for substantially immediate response. In one em-  
22 bodiment, the most popular 10,000 books are pre-searched overnight, with the effect

1 that prices and discounts are available for those most popular 10,000 books each morn-  
2 ing without further search.

3  
4 At a flow point 340B, the search subsystem 140 has pre-search a selected  
5 set of products, and is ready to use pricing and discount information obtained from that  
6 pre-search, and is also ready to proceed with another action.

7  
8 *Adaptive TTL for Selected Sellers*

9  
10 At a flow point 350A, the search subsystem 140 is ready to adapt TTL val-  
11 ues for selected seller subsystems 130.

12  
13 At a step 351, the search subsystem 140 maintains a selected TTL value for  
14 pricing and discount information for each searchable seller independently, with the ef-  
15 fect that searchable sellers who update their prices more frequently are searched more  
16 frequently, and with the effect that searchable sellers who update their prices less fre-  
17 quently are searched less frequently.

18  
19 The inventors have found that TTL values for pricing are a useful proxy  
20 for alacrity of response from the seller. The high-speed web crawler maintains non-  
21 expired pricing and discount information in a relatively local database for substantially

1 immediate response, with the effect that non-expired pricing and discount information  
2 need not be further searched at all.

3  
4 At a flow point 350B, the search subsystem 140 has is using adapted TTL  
5 values for selected seller subsystems 130, and is ready to proceed with another action.

6  
7 *Alternative Embodiments*

8  
9 Although preferred embodiments are disclosed herein, many variations  
10 are possible which remain within the concept, scope, and spirit of the invention. These  
11 variations would become clear to those skilled in the art after perusal of this applica-  
12 tion.

- 13  
14 • Searching for not necessarily identical products or services, where the features of  
15 each product or service might be comparable, and where it is possible to deter-  
16 mine the effective price for a product or service having a minimal set of features  
17 desired by the potential buyer. For example, not intended to be limiting in any  
18 way, cellular phones might be identifiable by their features, and a first model  
19 cellular phone having features A, B, and C, and an effective cost of \$50, would be  
20 preferable to a second model cellular phone having features A, B, C, and D, and  
21 an effective cost of \$75, where the potential buyer has indicated lack of interest in

1 feature D. This would have the effect that purchasing the first model would be  
2 least effective cost for the purposes of that specific potential buyer.

- 3
- 4 • Searching for packages of multiple products or services, where the search is tai-  
5 lored to a combined effective price that is minimized for the entire package. For  
6 example, not intended to be limiting in any way, a set of books A, B, and C,  
7 might be available at a single location at a stated price of \$100 with a discount for  
8 purchases over \$80 of 10% and free shipping for more than 2 books, for an effec-  
9 tive combined price of \$90, while the individual books might be available for less  
10 at other sellers, but with a combined price (for the minimum effective price of A  
11 individually, the minimum effective price of B individually, and the minimum  
12 effective price of C individually) of \$80, but with no volume discount and total  
13 shipping charges of \$12, for an combined effective price of \$92. This would have  
14 the effect that purchasing all 3 books at one location is less expensive than pur-  
15 chasing them individually at their least cost apiece.
  - 16
  - 17 • Although described primarily with regard to books and CDs, a primarily with  
18 regard to price searching, the invention is not limited to those specific products,  
19 features, or those implementations described herein.



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Those skilled in the art will recognize, after perusal of this application,

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that these alternative embodiments are illustrative and in no way limiting.